

WHAT IS CLAIMED IS:

1. A high-mechanical strength copper alloy,  
comprising 3.5 to 4.5% by mass of Ni, 0.7 to 1.0% by mass  
5 of Si, 0.01 to 0.20% by mass of Mg, 0.05 to 1.5% by mass  
of Sn, 0.2 to 1.5% by mass of Zn, and less than 0.005% by  
mass (including 0% by mass) of S, with the balance being  
made of Cu and inevitable impurities,  
wherein a diameter of a crystal grain in the alloy is from  
10 more than 0.001 mm to 0.025 mm; and the ratio (a/b),  
between a longer diameter a of a crystal grain on a cross  
section parallel to a direction of final plastic working,  
and a longer diameter b of a crystal grain on a cross  
section perpendicular to the direction of final plastic  
15 working, is 1.5 or less, and  
wherein the alloy has a tensile strength of 800 N/mm<sup>2</sup> or  
more.

2. The high-mechanical strength copper alloy as  
20 claimed in claim 1, wherein the content of S is less than  
0.002% by mass (including 0% by mass).

3. The high-mechanical strength copper alloy as  
claimed in claim 1, which further contains 0.01 to 0.5% by  
25 mass of Mn.

4. The high-mechanical strength copper alloy as claimed in claim 1, wherein the ratio (a/b) is 0.8 or more.

5 5. A high-mechanical strength copper alloy,  
comprising 3.5 to 4.5% by mass of Ni, 0.7 to 1.0% by mass  
of Si, 0.01 to 0.20% by mass of Mg, 0.05 to 1.5% by mass  
of Sn, 0.2 to 1.5% by mass of Zn, and further 0.005 to  
2.0% by mass in the sum total of at least one element  
10 selected from the group consisting of 0.005 to 0.3% by  
mass of Ag, 0.005 to 2.0% by mass of Co and 0.005 to 0.2%  
by mass of Cr, and less than 0.005% by mass (including 0%  
by mass) of S, with the balance being made of Cu and  
inevitable impurities,  
15 wherein a diameter of a crystal grain in the alloy is from  
more than 0.001 mm to 0.025 mm; and the ratio (a/b),  
between a longer diameter *a* of a crystal grain on a cross  
section parallel to a direction of final plastic working,  
and a longer diameter *b* of a crystal grain on a cross  
20 section perpendicular to the direction of final plastic  
working, is 1.5 or less, and  
wherein the alloy has a tensile strength of 800 N/mm<sup>2</sup> or  
more.

25 6. The high-mechanical strength copper alloy as

